

DATA SHEET

Digital Video/Analog Audio Optical Extender TH-DE-KIT-DVI-A-2F



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Digital Video/Audio Extender

Description

Optical DVI and audio extender, TH-DE-KIT-DVI-A-2F offers a high-quality, uncompressed data link between video source and a display peripheral. Optical technology for this transmission stretches the performance beyond the limitations of copper wire with longer length, data security, negligible RFI/EMI and the elimination of costly analog distribution systems

The EDID in a display can be read and restored by just plugging the transmitter to the display. This self EDID programming feature makes the installation of TH-DE-KIT-DVI-A-2F more easy and flexible at any variable resolution display system.

TH-DE-KIT-DVI-A-2F gives benefits of all optical fiber transmission, long distance extension and cost effectiveness to realize digital signage including audio. It offers integrated extension of digital video and analog stereo audio interface up to 2km (6,600 ft) for DVI. It maintains HD video signals up to WUXGA (1920x1200) at 60Hz refresh rate for PC.

It is designed to multiplex and de-multiplex the DVI video and analog audio over 2 LC fibers. It gives benefits of all-glass fiber transmission medium, data security, long distance extension up to 2km, easy plug-and-play installation and no RFI/EMI effects. In addition, a non-trivial feature is that both of Single and Multimode optical fibers are applicable.

The TH-DE-KIT-DVI-A-2F consists of a transmitter (Tx) and a receiver (Rx) connected by two duplex LC terminated single or multi-mode patch cords between them, which offers electrical perfect isolation. Each link module is driven by +12V/3A DC power adaptor.

The shipping group is as follows;

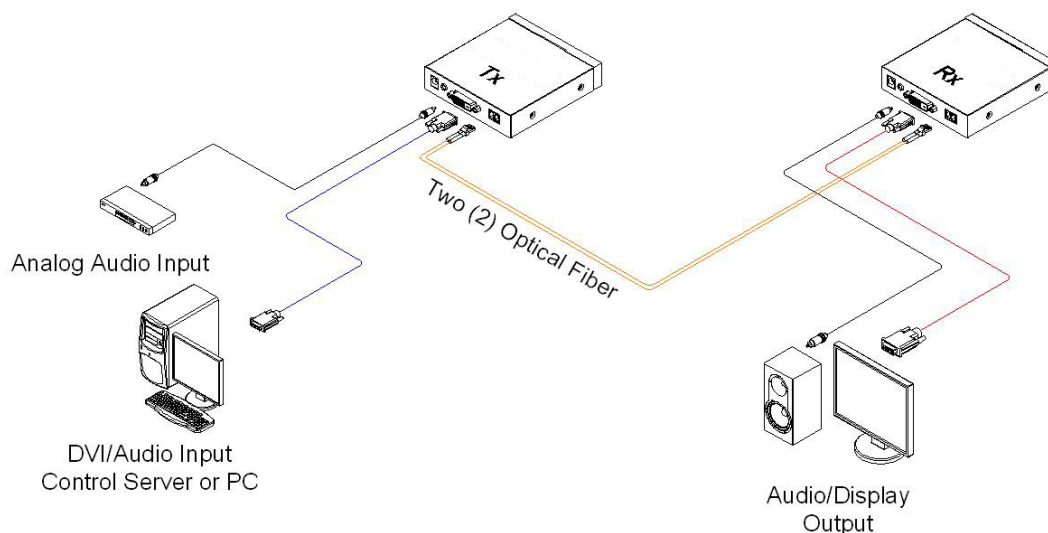
- 1) One pair of the transmitter and the Receiver
- 2) Two +12V/3A power adapters
- 3) User Manual

Feature

- ◆ Support all VESA resolution up to WUXGA (1920X1200) 60Hz (1.62Gbps) DVI data up to 2,000m.
- ◆ Applicable to both single and multi-mode fibers without any change of optical components.
 - (1) Up to 2,000m with two LC single-mode fibers
 - (2) Up to 500m with two LC multi-mode fibers
- ◆ Audio interface: Analog stereo audio
- ◆ Supports Self-EDID programming feature, detecting from a display and restoring to an EEPROM in the transmitter just by plugging to the display without any physical DDC connection
- ◆ Video data: WUXGA (1920X1200), 24bit color and 60Hz refresh rate for DVI.
- ◆ Interconnection between transmitter and receiver: Two (2) Duplex LC patch cords of single or multi-mode fiber.
- ◆ Applicable of both single and multi-mode fiber.
- ◆ +12 V DC power supply to each module.
- ◆ Complies with DDC2B.
- ◆ No software to install; plug and play.
- ◆ Data security with negligible RFI/EMI emissions
- ◆ Certifies FCC and CE standards for EMI/RFI emission

Applications

- ◆ Digital display system integration for medical, military, aerospace, factory automation, and traffic control platforms.
- ◆ Digital FPD, PDP and projector installation in conference rooms, auditoriums and for kiosk systems
- ◆ LED signboards for large scale information display and stadiums



Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	T_{stg}	- 10	+ 85	°C
Supply Voltage	V_{CC}	10	16	V
Transmitter Differential Input Voltage	V_d	-	1	V
Relative Humidity	RH	10	85	%
Lead Soldering Temperature & Time	-	-		260°C, 10 sec

Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
Ambient Operating Temperature	T_A	0		+ 50	°C
Data Output Load	R_{LD}		50		Ω
Power Supply Rejection (Note1)	PSR		50		mV _{p-p}
Supply Voltage	V_{CC}	+ 11.4	+ 12.0	+ 12.6	V

Note1. Tested with a 50mV_{p-p} sinusoidal signal in the frequency range from 500 Hz to 500 MHz on the V_{CC} supply with the recommended power supply filter in place. Typically less than a 0.25 dB change in sensitivity is experienced.

Electrical Power Supply Characteristics

($T_A = 0\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$, unless otherwise noted)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage		V_{CC}	11.4	12	12.6	V
Supply Current	TX	I_{TCC}	460	540	600	mA
	RX	I_{RCC}	400	480	540	mA
Power Dissipation	TX	P_{TX}	5.3	6.5	7.6	W
	RX	P_{RX}	4.6	5.8	6.8	W

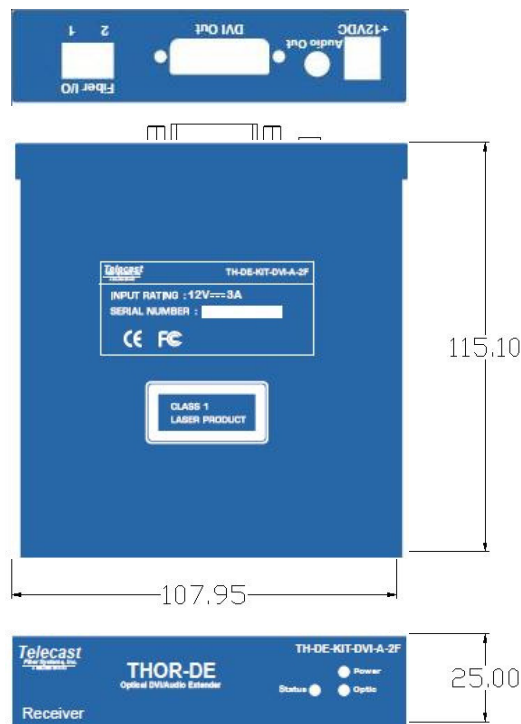
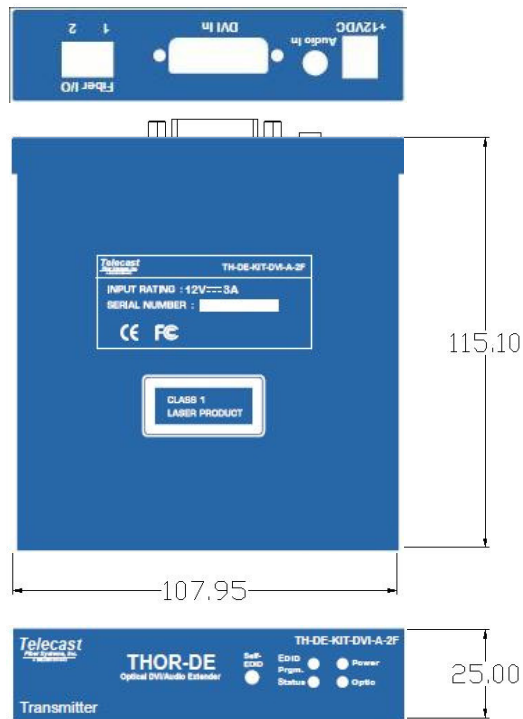
Optical & Electrical Characteristics

(T_{op} = 25°C)

Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Data Bit Rate	1310 Tx	PRBS 2 ²³ -1,NRZ	Mbps		1250		
	1550 Rx						
	1550 Tx	PRBS 2 ²³ -1,NRZ	Mbps		1250		
	1310 Rx						
Fiber Length 9μm core SMF		10 ⁻¹⁰ BER, 155Mbps/1.25Gbps	km	2			
TRANSMITTER							
Average Power Output	P _{OUT}	I _f =I _{BIAS} + I _{mod} /2	dBm	-11	-9	-7	
Extinction Ratio	ER		dB	5			
Center Wavelength	λ _c	CW, @ P _{OUT}	nm	1270 1500	1310 1550	1355 1600	@1.31μm @1.55μm
Spectral Width		RMS Width	nm			4.0	
RIN			dB/Hz			-120	
Optical Rise/Fall Time	t _r /t _f	20 – 80%	nsec			0.26 2.0	
RECEIVER							
Sensitivity (Average Input Power)	P _{IN,MIN}	PRBS 2 ²³ -1, 10 ⁻¹⁰ BER	dBm	-19			1.25G Rx
Wavelength	1310 1550	□	nm	1260 1500	1310 1550	1360 1600	
Receiver Overload	P _{IN,MAX}		dBm	-3.0			
Signal Detect Threshold Decreasing light input Increasing light input	P _D P _A		dBm dBm		P _{IN,MIN} -3 P _{IN,MIN} -2		
Signal Detect Hysteresis	P _A - P _D		dB	0.5			
Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Audio (Analog)							
Analog Sample Rate	F _{audio_a}		kHz		48		
Input level	A _{in}		V _{pp}		0.56V _{ss}		
output level	A _{out}	V _{pp} =3.3V/Analog	V _{pp}		0.65		
Input Impedance			kΩ		25		
Output Impedance			Ω		100		

Drawing of transmitter and receiver modules

Dimension [mm]



DVI Pin Description

Pin	Symbol	Functional Description
1	CH2-	TMDS Data Signal Channel 2 Negative
2	CH2+	TMDS Data Signal Channel 2 Positive
3	GND	TMDS Data Signal Channel 2 Shield
4		
5		
6	DDC Clock	DDC Clock line for DDC2B communication
7	DDC Data	DDC Data line for DDC2B communication
8	N.C.	
9	CH1-	TMDS Data Signal Channel 1 Negative
10	CH1+	TMDS Data Signal Channel 1 Positive
11	GND	TMDS Data Signal Channel 1 Shield
12		
13		
14	5 V	5 V Input for Transmitter from Host 5 V Output for Monitor from Receiver
15	GND	Ground
16	Hot plug Detect	Signal is driven by monitor to enable the system to identify the presence of a monitor
17	CH0-	TMDS Data Signal Channel 0 Negative
18	CH0+	TMDS Data Signal Channel 0 Positive
19	GND	TMDS Data Signal Channel 0 Shield
20		
21		
22	GND	TMDS Clock Signal Shield
23	CLK+	TMDS Clock Channel Positive
24	CLK-	TMDS Clock Channel Negative

Note: Channels 3, 4 and 5 dual-link data signal pins are not used

Reliability Test

Opticis utilizes three types of test criteria for a reduction of variability and a continuous improvement of the process by its FEMA (Failure Mode and Effective Analysis) program.

- 1) Mechanical test (vibration, shock)
- 2) Temperature & humidity tests
- 3) EMC test (*FCC class A and CE Verification*)

Mechanical and Temperature & Humidity Test Data

Heading	Test	Conditions	Duration	Sample Size	Failure	Remarks
Operating Test	Operating at each Temperature (See Note)	* 0 ~ 50 °C (Interval: 10 °C)	30 Min (Each Temperature)	n =3	0	Note: Visual Test on the Display
Storage Test	Low Temperature	* T _s = -30 °C	96 HR	n=3	0	1. TS: Storage Temperature
	High Temperature	* T _s = 70 °C	96 HR	n=3	0	2. RH: Relative Humidity
	High Humidity High Temperature	* T _s : 60 °C * RH: 90%	96 HR	n=3	0	
Mechanical Test	Mechanical Shock	* Pulse: 11 ms * Peak level: 30 g * Shock pulse: 3 times/Axis	-	n=2	0	
	Mechanical Vibration	* Peak acceleration: 20 g * Frequency: 20~2000 Hz * Sweep time: 30 Minutes * 4 Times/Axis	-	n=2	0	

EMC Test Data

1) EMI: Meet FCC class A (ICES-003) and CE class A

STANDARDS		CONDITIONS
EN 55 022 (CISPR22) FCC; PART 15 SUBPART B	CE (Conducted Emission) & RE (Radiated Emission)	Meet Class A
EN 61000-3-2 (IEC 61000-3-2)	Harmonics	Meet Class A
EN 61000-3-3 (IEC 61000-3-3)	Flickers	Meet Class A

2) EMS: Meet CE standards (EN 55024) and CISPR24 equivalents

STANDARDS		CONDITIONS
EN 61 000-4-2:1995	Electrostatic Discharge Immunity (Air: 8kv, Contact: 4kv)	Meet Criterion A
EN 61 000-4-3:1996	Radiated RF E-Field (80~1000 MHz) 3V/m (AM 80%, 1kHz)	Meet Criterion A
EN 61 000-4-4:1995	Fast Transients (5kHz, 60Seconds)	Meet Criterion A
EN 61 000-4-5:1995	Surge Transients	Meet Criterion A
EN 61 000-4-6:1996	Conducted Susceptibility (CS) Radiated Susceptibility (RS)	Meet Criterion A
EN 61 000-4-11:1994	Voltage Dips, Interruption & Variation	Meet Criterion A and C